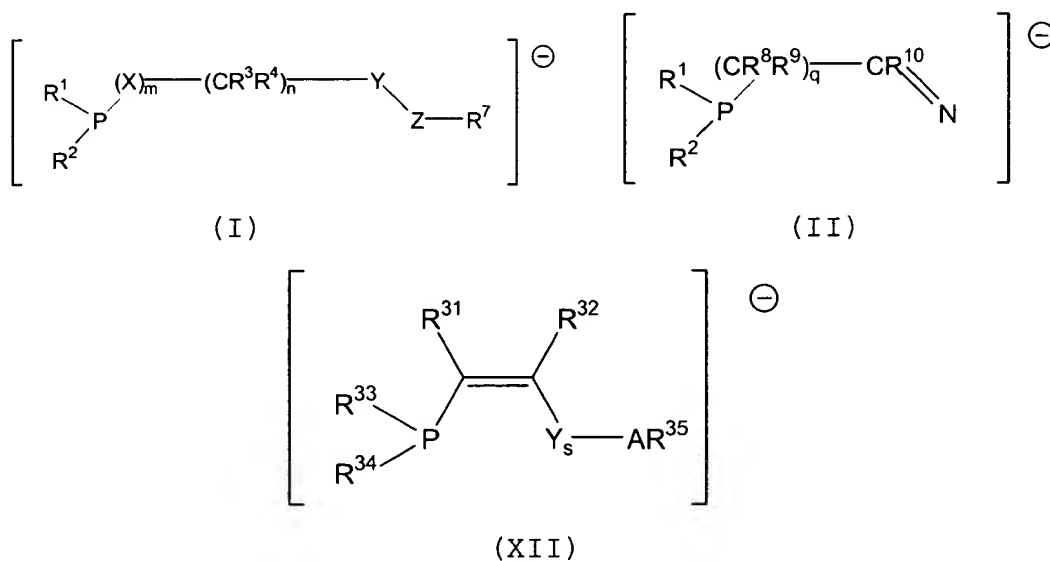


Listing of Claims

1. (currently amended) A process for the polymerization of olefins, comprising the step of contacting, at a temperature of about -100°C to about +200°C, at least one polymerizable olefin with an active polymerization catalyst comprising a Group 3 through 11 (IUPAC) transition metal or a lanthanide metal complex of a ligand of the formula (I), (II) or (XII)



wherein:

R^1 and R^2 are each independently hydrocarbyl, substituted hydrocarbyl or a functional group;

Y is $CR^{11}R^{12}$, $S(T)$, $S(T)_2$, $P(T)Q$, NR^{36} or $NR^{36}NR^{36}$;

X is O, CR^5R^6 or NR^5 ;

A is O, S, Se, N, P or As;

Z is O, Se, N, P or As;

each Q is independently hydrocarbyl or substituted hydrocarbyl;

R^3 , R^4 , R^5 , R^6 , R^{11} and R^{12} are each independently hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

R^7 is hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group, provided that when Z is O or Se, R^7 is not present;

R⁸ and R⁹ are each independently hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

R¹⁰ is hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

each T is independently =O or =NR³⁰;

R³⁰ is hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

R³¹ and R³² are each independently hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

R³³ and R³⁴ are each independently hydrocarbyl or substituted hydrocarbyl, provided that each is independently an aryl substituted in at least one position vicinal to the free bond of the aryl group, or each independently has an E_s of -1.0 or less;

R³⁵ is hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group, provided that when A is O, S or Se, R³⁵ is not present;

each R³⁶ is independently hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

m is 0 or 1;

s is 0 or 1;

n is 0 or 1; and

q is 0 or 1;

and provided that:

any two of R³, R⁴, R⁵, R⁶, R⁸, R⁹, R¹¹ and R¹² bonded to the same carbon atom taken together may form a functional group;

any two of R¹, R², R³, R⁴, R⁵, R⁶, R⁷, R⁸, R⁹, R¹¹, R¹², R³¹, R³², R³³, R³⁴, R³⁵ and R³⁶ bonded to the same atom or vicinal to one another taken together may form a ring; and

when said ligand is (I), Y is C(O), Z is O, and R¹ and R² are each independently hydrocarbyl, then R¹ and R² are each independently an aryl substituted in one position vicinal to the free bond of the aryl group, or R¹ and R² each independently have an E_s of -1.0 or less.

2. (original) The process of claim 1, wherein said transition metal is Ni, Pd, Pt, Fe, Co, Ti, Zr, V, Hf, Cr or Cu.

3. (original) The process of claim 2, wherein said transition metal is Ni, Pd, Ti or Zr.

4. (original) The process of claim 1, wherein the ligand is (I) and:

the transition metal is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is CR¹¹R¹², R¹¹ is hydrocarbyl or substituted hydrocarbyl, R¹² is hydrocarbyl, substituted hydrocarbyl or a functional group, and Z is O; or

the transition metal is Ti, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is CR¹¹R¹², R¹¹ is hydrocarbyl or substituted hydrocarbyl, R¹² is hydrocarbyl, substituted hydrocarbyl or a functional group, and Z is O; or

the transition metal is Zr, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is CR¹¹R¹², R¹¹ is hydrocarbyl or substituted hydrocarbyl, R¹² is hydrocarbyl, substituted hydrocarbyl or a functional group, and Z is O; or

the transition metal is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, R⁷ is hydrocarbyl or substituted hydrocarbyl, Y is CR¹¹R¹², R¹¹ is hydrogen, R¹² is hydrocarbyl or substituted hydrocarbyl, and Z is N; or

the transition metal is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is CR¹¹R¹², R¹¹ and R¹² taken together are oxo, and Z is O; or

the transition metal is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, R⁷ is hydrocarbyl or substituted hydrocarbyl, Y is CR¹¹R¹², R¹¹ and R¹² taken together are oxo, and Z is N; or

the transition metal is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is S(T), T is =O and Z is O; or

the transition metal is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is S(T), T is =N-silyl, Z is N and R⁷ is silyl; or

the transition metal is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is S(T), T is =O, Z is N, and R⁷ is hydrocarbyl or substituted hydrocarbyl; or

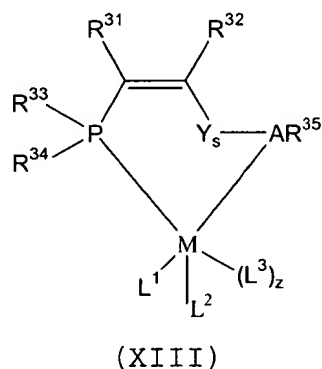
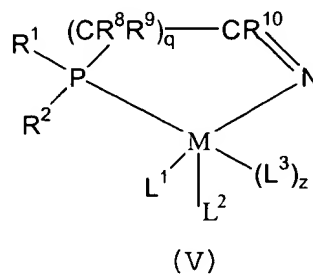
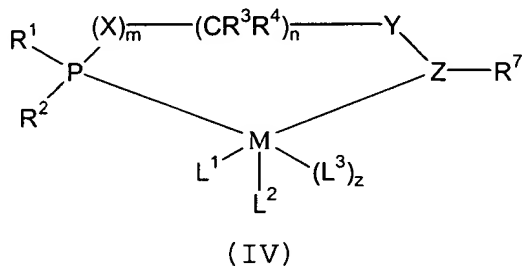
the transition metal is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is CR¹¹R¹², R¹¹ and R¹² taken together are a ring and Z is O; or

the transition metal is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is CR¹¹R¹², R¹¹ and R¹² taken together are N-hydrocarbyl- or N-substituted hydrocarbylimino, Z is N and R⁷ is hydrocarbyl or substituted hydrocarbyl; or

the transition metal is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is S(T), T is =O and Z is O; or

the transition metal is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is CR¹¹R¹², R¹¹ and R¹² taken together are sulfo, Z is N and R⁷ is hydrocarbyl or substituted hydrocarbyl.

5. (currently amended) A process for the polymerization of olefins, comprising the step of contacting, at a temperature of about -100°C to about +200°C, at least one polymerizable olefin with a compound of the formula (IV), (V) or (XIII)



wherein:

R¹ and R² are each independently hydrocarbyl, substituted hydrocarbyl or a functional group;

Y is CR¹¹R¹², S(T), ~~S(T)~~₂, P(T)Q, NR³⁶ or NR³⁶NR³⁶;

X is O, CR⁵R⁶ or NR⁵;

A is O, S, Se, N, P or As;

Z is O, Se, N, P or As;

each Q is independently hydrocarbyl or substituted hydrocarbyl;

R³, R⁴, R⁵, R⁶, R¹¹ and R¹² are each independently hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

R⁷ is hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group, provided that when Z is O or Se, R⁷ is not present;

R^8 and R^9 are each independently hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

R^{10} is hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

each T is independently $=O$ or $=NR^{30}$;

R^{30} is hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

R^{31} and R^{32} are each independently hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

R^{33} and R^{34} are each independently hydrocarbyl or substituted hydrocarbyl, provided that each is independently an aryl substituted in at least one position vicinal to the free bond of the aryl group, or each independently has an E_s of -1.0 or less;

R^{35} is hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group, provided that when A is O, S or Se, R^{35} is not present;

each R^{36} is independently hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

m is 0 or 1;

s is 0 or 1;

n is 0 or 1; and

q is 0 or 1;

M is a Group 3 through Group 11 transition metal or a lanthanide metal; and

L^1 is a monodentate monoanionic ligand into which an ethylene molecule may insert between L^1 and M, and L^2 is a monodentate neutral ligand which may be displaced by ethylene or an empty coordination site, or L^1 and L^2 taken together are a monoanionic bidentate ligand into which ethylene may insert between said monoanionic bidentate ligand and said nickel atom, and each L^3 is independently a monoanionic ligand and z is the oxidation state of M minus 2; and provided that;

any two of R^3 , R^4 , R^5 , R^6 , R^8 , R^9 , R^{11} and R^{12} bonded to the same carbon atom taken together may form a functional group;

any two of R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , R^7 , R^8 , R^9 , R^{11} , R^{12} , R^{31} , R^{32} , R^{33} , R^{34} , R^{35} and R^{36} bonded to the same atom or vicinal to one another taken together may form a ring; and

when said compound is (IV), Y is C(O), Z is O, and R¹ and R² are each independently hydrocarbyl, then R¹ and R² are each independently an aryl substituted in one position vicinal to the free bond of the aryl group, or R¹ and R² each independently have an E_s of -1.0 or less.

6. (original) The process of claim 5, wherein M is Ni, Pd, Pt, Fe, Co, Ti, Zr, V, Hf, Cr or Cu.

7. (original) The process of claim 6, wherein M is Ni, Pd, Ti or Zr.

8. (original) The process of claim 5, wherein the compound is (IV) and:

M is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is CR¹¹R¹², R¹¹ is hydrocarbyl or substituted hydrocarbyl, R¹² is hydrocarbyl, substituted hydrocarbyl or a functional group, and Z is O; or

M is Ti, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is CR¹¹R¹², R¹¹ is hydrocarbyl or substituted hydrocarbyl, R¹² is hydrocarbyl, substituted hydrocarbyl or a functional group, and Z is O; or

M is Zr, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is CR¹¹R¹², R¹¹ is hydrocarbyl or substituted hydrocarbyl, R¹² is hydrocarbyl, substituted hydrocarbyl or a functional group, and Z is O; or

M is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, R⁷ is hydrocarbyl or substituted hydrocarbyl, Y is CR¹¹R¹², R¹¹ is hydrogen, R¹² is hydrocarbyl or substituted hydrocarbyl, and Z is N; or

M is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is CR¹¹R¹², R¹¹ and R¹² taken together are oxo, and Z is O; or

M is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, R⁷ is hydrocarbyl or substituted hydrocarbyl, Y is CR¹¹R¹², R¹¹ and R¹² taken together are oxo, and Z is N; or

M is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is S(T), T is =O and Z is O; or

M is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is S(T), T is =N-silyl, Z is N and R⁷ is silyl; or

M is Ni, m is 0, n is 1, R³ and R⁴ are hydrogen, Y is S(T), T is =O, Z is N, and R⁷ is hydrocarbyl or substituted hydrocarbyl; or

M is Ni, m is 0, n is 1, R^3 and R^4 are hydrogen, Y is $CR^{11}R^{12}$, R^{11} and R^{12} taken together are a ring and Z is O; or

M is Ni, m is 0, n is 1, R^3 and R^4 are hydrogen, Y is $CR^{11}R^{12}$, R^{11} and R^{12} taken together are N-hydrocarbyl- or N-substituted hydrocarbylimino, Z is N and R^7 is hydrocarbyl or substituted hydrocarbyl; or

M is Ni, m is 0, n is 1, R^3 and R^4 are hydrogen, Y is S(T), T is =O and Z is O; or
the transition metal is Ni, m is 0, n is 1, R^3 and R^4 are hydrogen, Y is $CR^{11}R^{12}$, R^{11} and R^{12} taken together are sulfo, Z is N and R^7 is hydrocarbyl or substituted hydrocarbyl.

Claims 9-11 (canceled).

Claims 12-15 (withdrawn from consideration).

Claims 16-18 (canceled).